

Using Hyper Spectral Imaging to Predict Peanut Pod Maturity.

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Research was conducted in North Carolina during 2003 and 2004 to determine if hyperspectral imaging could be used as a predictor of peanut pod maturity. Canopy reflectance was measured in late September and early October using an ASD FieldSpec Pro FR portable spectroradiometer. Reflectance for each wavelength 350 to 2,500 nm was grouped into 50 nm sections. Data for pod yield; percentage of total sound mature kernels (% TSMK), extra large kernels (% ELK), and fancy pods (% FP), and pods with brown or black mesocarp color; and reflectance were subjected to analysis of variance. In one experiment, the Virginia market type cultivar VA 98R was planted approximately May 5, May 15, May 25, and June 5, and peanut pods for each planting date were dug based on pod mesocarp color determination. In a second experiment, the cultivar NC-V 11 was planted in early or mid May or in early June, and peanut pods for each planting date were dug based on pod mesocarp color. In the third experiment, the cultivars VA 98R and Perry were planted in early May in single and twin row planting patterns. These cultivars can differ in the number of days required to reach optimum pod maturity by as much as 12 days. Imaging data was correlated with the percentage of brown and black pod mesocarp color for each planting date. Percentages of brown and black pods for the May 5, May 15, May 25, and June 5 planting dates were 68, 63, 56, and 31% in 2003 and 69, 69, 40, and 22% in 2004, respectively, when images were recorded on the same day for all plots in late September. Pod mesocarp color differed when NC-V 11 was planted in early or mid May compared with planting in early June. There was no difference in reflectance when comparing images from the peanut canopy in either planting date trial in 2003; however, some differences in reflectance were noted in both trials. While pod maturity differed when comparing mesocarp color of VA 98R and Perry in the row pattern study, the only difference in reflectance in either of the two years was noted between cultivars in 2003, in the 1350-1399 nm bands. In a final experiment, the cultivars Gregory and Georgia Green were planted to determine if hyperspectral differences could be detected between the Virginia market type cultivar Gregory and the runner market type cultivar Georgia Green. In 2003, no significant differences were noted between cultivars. In 2004, however, there were differences between cultivars in the upper-visible spectrum through the infrared region of the spectrum, from 700 nm to 1149 nm. In the third trial, the only significant differences between cultivars were noted in the infrared region from 900-945 nm, and 1100-1199 nm. These data suggest that hyperspectral imaging does not appear to be an accurate indicator of pod maturity. In late September distinct differences in pod mesocarp color were noted for all experiments although few consistent differences in hyperspectral imaging were noted. These data are consistent with observations by others, at least in the visible range, indicating that aboveground plant growth is a poor indicator of peanut pod maturity.